

What is claimed is:

1. A process for coproducing butene oligomers and
tert-butyl ethers from isobutenic C₄ streams by
 - 5 a) partly oligomerizing the isobutenic C₄ streams
over an acidic catalyst to give butene
oligomers and subsequently
 - b) etherifying the remaining isobutene with an
alcohol under acidic catalysis to give tert-
10 butyl ethers,
which comprises
carrying out the etherification under acid
catalysis in stage b) in at least two reaction
stages, of which at least the last reaction stage
15 is carried out as a reactive distillation.
2. The process as claimed in claim 1,
wherein
the acidic catalyst used in stage a) is an ion
20 exchanger whose protons have partly been exchanged
for metal ions of groups 1 to 12 of the Periodic
Table.
3. The process as claimed in claim 2,
25 wherein
from 1 to 60% of the protons of the ion exchanger
used in stage a) have been exchanged for metal
ions.
- 30 4. The process as claimed in any of claims 1 to 3,
wherein
the oligomerization in stage a) is carried out up
to an isobutene conversion of from 50 to 95%.
- 35 5. The process as claimed in any of claims 1 to 4,
wherein
the oligomerization in stage a) is carried out in
the presence of a moderator.

6. The process as claimed in claim 5,
wherein
the moderator used is MTBE, TBA, methanol or water
in a molar ratio of from 0.01 to 5 per mole of
isobutene.
7. The process as claimed in any of claims 1 to 6,
wherein
the butene oligomers obtained in stage a) are
removed before the acid-catalyzed etherification
in stage b).
8. The process as claimed in any of claims 1 to 7,
wherein
the alcohol used in stage b) is methanol or
ethanol.
9. The process as claimed in any of claims 1 to 8,
wherein
the polyunsaturated hydrocarbons contained in the
isobutenic C₄ streams are catalytically
hydrogenated before the oligomerization in stage
a).
10. The process as claimed in claim 9,
wherein
the polyunsaturated compounds are hydrogenated in
at least two reaction stages, of which at least
the last reaction stage is carried out in the
presence of 0.05 - 100 ppm by weight of CO.
11. The process as claimed in any of claims 1 to 10,
wherein
more than 90% of the butene oligomers obtained in
stage a) are isobutene oligomers.